Name _____

Date ____ Hour ____

Combining Functions - Notes 1

Adding Functions

$(f+g)(x) = f(x) + g(x)$

- Simply leave the functions unchanged, add them together, and combine like terms.

Example 1: $f(x) = x^2 + 4x - 5$
$g(x) = x - 7$

$(f+g)(x) = f(x) + g(x)$
$= x^2 + 4x - 5 + x - 7$ (_____)
$= x^2 + 5x - 2$ (_____)

Describe what's happening in each step

Ex 2: $f(x) = -2x^3 + x^2 - 1$
$g(x) = x^2 + x + 3$

$(f+g)(x) = f(x) + g(x)$
$=$ _____ $+$ _____
$=$ _____

Complete the example

* Remember, when you simplify you just combine like terms. Don't change any signs (like you do when you solve equations).

On a separate sheet, do p. 387 #5, 17, 19 (Adding only)

Combining Functions - Notes 2

SUBTRACTING FUNCTIONS

$$(f-g)(x) = f(x) - g(x)$$

- Just subtract the second function from the first.

* Be sure to distribute the negative!

Example 1: $f(x) = x^2+2x-3$

$g(x) = x+1$

$(f-g)(x) = f(x) - g(x)$

$= x^2+2x-3 - (x+1)$ ← Why do I need parenthesis?

$= x^2+2x-3 - x - 1$

$= \boxed{x^2+x-4}$

← Describe the steps

Ex 2: $(g-f)(x) = g(x) - f(x)$

$=$ ____ $-$ (____)

$=$ ____ (____)

$=$ ____ (____)

Complete the example ⇒

On separate sheet, do p. 387 #5, 17, 19 (Subtracting only)

Combining Functions - Notes 3

MULTIPLYING FUNCTIONS

$(f \cdot g)(x) = f(x) \cdot g(x)$

means to leave (instead of plugging in a number.

does NOT mean to multiply y x at the end!

- Multiply one function by the other
- distribute to simplify

Example 1 $f(x) = 3x$, $g(x) = x + 2$

$(f \cdot g)(x) = f(x) \cdot g(x)$ ← Describe the steps

$= 3x(x+2)$

$= \boxed{3x^2 + 6x}$

Example 2 $f(x) = x^2 + 5x$ $g(x) = 3x - 2$

$(f \cdot g)(x) = f(x) \cdot g(x)$

$= (\quad)(\quad)$

Compute the example →

$=$

$= \boxed{\quad}$

On a separate sheet, do p. 387 #5, 17, 19 (multiplying only)

Combining Functions - Notes 4

DIVIDING FUNCTIONS

$$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$$

- Simplify but the function indicated on top of the other (then you're done!).

Example 1: $f(x) = x+2$, $g(x) = 3x$

- $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \boxed{\frac{x+2}{3x}}$

* Note that in the new function $\left(\frac{f}{g}\right)(x) = \frac{x+2}{3x}$, x CANNOT be 0 (because I can't divide by 0).

- $\left(\frac{g}{f}\right)(x) = \frac{g(x)}{f(x)} = \boxed{\frac{3x}{x+2}}$

* Note $x+2 \neq 0$ so $x \neq -2$!

($\neq$ symbol for not equal)

On a separate sheet, do p. 387 #5, 17, 19 (dividing only)